

8.19 PRINCE GEORGE'S COUNTY

This chapter presents information about stream conditions of potential management interest in Prince George's County based on the 2000-2004 Maryland Biological Stream Survey (MBSS) results. Information from MBSS data collected between 1994 and 1997 can be found in MDNR 2001q.

8.19.1 Ecological Health

Based on the three ecological health indicators used by the MBSS, the overall condition of Prince George's County streams during 2000-2004 was Poor (Figure 8-150). The FIBI results indicate that 21% of the streams in the county were in Good condition, while only 11% rated Good using the BIBI. In contrast, 56% of the streams in the county scored as Poor or Very Poor using the CBI, while 9% scored as Good and 35% scored as Fair.

Sites with high IBI scores were scattered throughout most of the county, but occurred more frequently in the southern part of the county. In contrast, heavy concentrations of sites with Very Poor IBI scores were located in the northern half of the county. The highest rated stream in Prince George's County using the Combined Biotic Index (CBI) was Swanson Creek, while the lowest rated streams included Oxon Run, as well as unnamed tributaries to Indian Creek and the Patuxent River (Table 8-37). Based on Stream Waders volunteer data, the Patuxent, Anacostia and Western Branch watersheds were dominated by sites rated as Poor or Very Poor for benthic macroinvertebrates (Table 8-38). In contrast, the only Stream Waders sites that rated Good during 2000-2004 were found in the Piscataway Creek watershed.

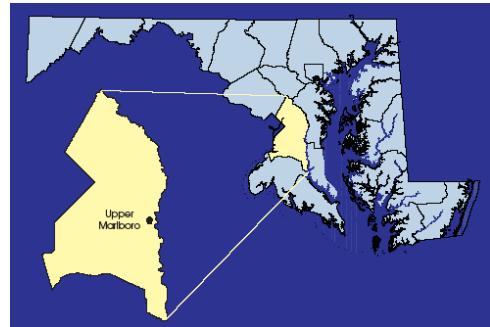
8.19.2 Physical Habitat

8.19.2.1 Overall Condition

Based on the Physical Habitat Index (PHI), 12% of the streams in Prince George's County had Minimally Degraded habitat, 46% had Partially Degraded habitat, and 42% had Degraded or Severely Degraded habitat (Figure 8-151). There was no clear pattern in the distribution of high and low quality sites.

8.19.2.2 Trash

Only 23% of the stream miles in Prince George's County were rated Optimal for trash (Figure 8-152). In contrast, 48% of streams were rated as being in Marginal or Poor condition. Trash levels were demonstrably higher in the eastern portion of the county, but several sites in the



Western Branch watershed had high levels of human refuse as well.

8.19.2.3 Channelization

About 31% of the stream miles in Prince George's County were channelized to some extent (Table 8-4). Earthen ditches (10%), rip-rap (9%) and concrete channels (9%) were the most common types of channelization. Other forms included culvert pipes and gabion baskets. Most channelization occurred in the northern part of the county (Figure 8-153).

8.19.2.4 Inadequate Riparian Buffer

About 2% of the stream miles in Prince George's County had no riparian buffers during the 2000-2004 MBSS (Table 8-3). An additional 14% had severe breaks in existing riparian buffers. Buffer breaks were more common in the eastern portion of the county, and there was no apparent geographic trend in sites with no riparian buffer (Figure 8-154). Additional information about buffer breaks, analyzed by county, is provided in: 2000-2004 Maryland Biological Stream Survey Volume 10: Riparian Zone Conditions (http://www.dnr/Maryland.gov/streams/pubs/ea05-7_riparian.pdf).

8.19.2.5 Eroded Banks/Bedload Movement

Nearly 52% of the stream miles in Prince George's County were rated as having minimal (Optimal) amounts of bank erosion (Figure 8-155). In contrast, 22% of streams were rated as Poor for bank erosion and an additional 11% of stream miles were rated as Marginal. No geographic pattern in the location of high erosion sites was evident, and erosion was generally minor in the Anacostia drainage.

There was a fairly even distribution of bar formation types in Prince George's County (Figure 8-155). Over 18% of stream miles were devoid of bars, 26% had minor bar formation, 26% had moderate bar formation, and 30% had extensive bar formation. Areas with extensive bar

formation appeared to be more prevalent in the southern part of the county.

8.19.3 Key Nutrients

8.19.3.1 Nitrate-Nitrogen

Nearly 85% of the stream miles in Prince George's County had nitrate-nitrogen levels within the range of forested streams in Maryland (Figure 8-156). The remaining 15% of stream miles had nitrate-nitrogen at levels about background, but no streams exceeded the 5 mg/l threshold where biological impacts have been documented. In general, nitrate-nitrogen levels were higher in the northern part of the county.

8.19.3.2 Total Phosphorus

About 64% of the stream miles in Prince George's County have total phosphorus levels above the range encountered in forested Maryland streams (Figure 8-157). Of these stream miles, nearly 22% had levels greater than the threshold where faunal loss may occur. High total phosphorus levels occurred primarily along the eastern boundary of the county.

8.19.4 Stream and River Biodiversity

To provide a means to prioritize stream systems for biodiversity protection and restoration within each county and on a statewide basis, a tiered watershed and stream reach prioritization method was developed. Special emphasis was placed on state-listed species, stronghold watersheds for state-listed species, and stream reaches with one or more state-listed aquatic fauna. Fauna considered included stream salamanders, freshwater fishes, and freshwater mussels. Rare, pollution-sensitive benthic macroinvertebrates collected during the 1994-2004 MBSS were also used to identify the suite of watersheds necessary to conserve the full array of known stream and river biota in Maryland. A complete description of the biodiversity ranking process is found in: 2000-2004 Maryland Biological Stream Survey Volume 9: Stream and Riverine Biodiversity (http://www.dnr/Maryland.gov/streams/pubs/ea05_6_biodiv.pdf).

Of the nine watersheds found in Prince George's County, Zekiah Swamp, Western Branch, Piscataway Creek, and Potomac Upper Tidal/Oxon Creek were classified as Tier 1, meaning that these watersheds serve as strongholds for one or more state listed aquatic species (Figure 8-158). It is also noteworthy

that Zekiah Swamp is the highest rated in Maryland in terms of stream and river biodiversity ranking, and Western Branch ranked eighth in the state. The Patuxent River Upper and Mattawoman Creek watersheds were classified as Tier 2 watersheds, meaning that they serve as strongholds for one or more non-state listed species of Greatest Conservation Need (GCN), and have state-listed aquatic fauna present. In stark contrast, the Patuxent River Middle watershed was among the lowest ranking for stream and river biodiversity in the state (79th of 84). Any reaches that had either state-listed or GCN species, or high intactness values were highlighted to facilitate additional emphasis in planning restoration and protection activities.

8.19.5 Stressors

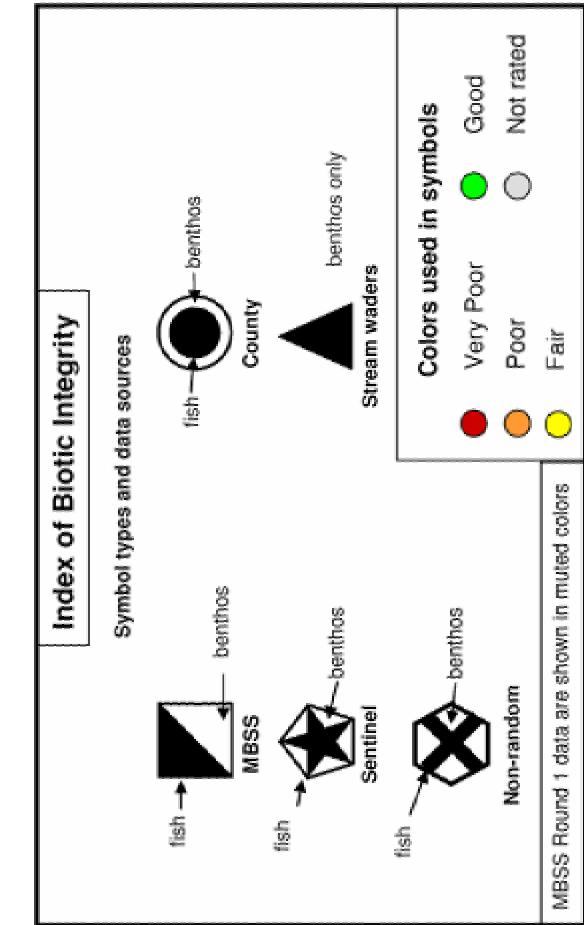
At 95% of stream miles, the most extensive stressor characterized by the MBSS in Prince George's County during the 2000-2004 MBSS was non-native terrestrial plants in the riparian zone (Figure 8-5). Other stressors found were: streams with > 5% urban land use upstream (80% of stream miles); non-native aquatic fauna (present in 61% of stream miles); eroded banks (34% of stream miles); channelized streams (20% of stream miles); acid deposition (observed in 25% of stream miles); low dissolved oxygen (5%); and streams with no riparian buffer (2%).

AN IMPORTANT NOTE ON BIODIVERSITY MANAGEMENT

Perhaps the largest ongoing natural resources restoration and protection effort in Maryland is associated with the Chesapeake Bay. In most cases, freshwater biodiversity is not specifically considered during placement and prioritization of Bay restoration and protection projects. In this report and in the more detailed volume in the series on aquatic biodiversity, a system of biodiversity ranking is presented to provide counties and other stewards with a means to plan appropriate protection and restoration activities in locations where they would most benefit stream and river species. Given the historically low level of funding for biodiversity protection and restoration in Maryland and elsewhere, the potential benefit of incorporating freshwater biodiversity needs into other efforts is quite large.

However, it is important to note that although freshwater taxa are the most imperiled group of organisms in Maryland, other groups and individual species not typically found in freshwater habitats are also at high risk and constitute high priority targets for conservation. In addition, freshwater taxa that prefer habitats such as small wetlands may not be well-characterized by the ranking system employed here. To conserve the full array of Maryland's flora and fauna, it is clearly necessary to use other, landscape-based tools and consider factors such as maintaining or reconnecting terrestrial travel corridors.

Key to MBSS 2000-2004 County Maps



Tier 1:	Stronghold watershed (most robust remaining population) for one or more state-listed fish, aquatic herpetofauna, or freshwater mussels.
Tier 2:	Stronghold watershed for one or more non-state listed species of greatest conservation need (GCN) fish, aquatic herpetofauna, or freshwater mussels, that also had state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 3:	Stronghold watershed for one or more non-state listed GCN fish, aquatic herpetofauna, or freshwater mussels, no state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 4:	Non-stronghold watershed with one or more state-listed fish, aquatic herpetofauna, or freshwater mussels present.
Tier 5:	Not of the above, but a biodiversity conservation watershed. In other words, part of the network of watersheds that must be conserved to keep all native fishes, aquatic herpetofauna, freshwater mussels, and rare, pollution sensitive benthic macroinvertebrates extant in Maryland.
Tier 6:	Not of the above.

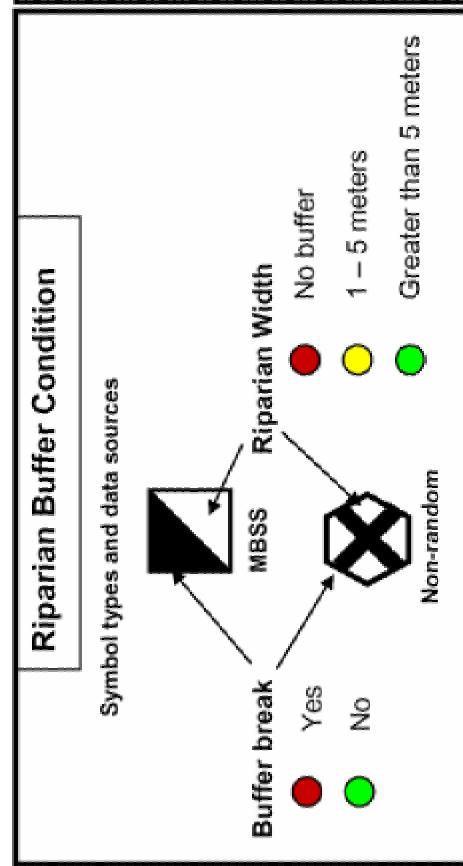
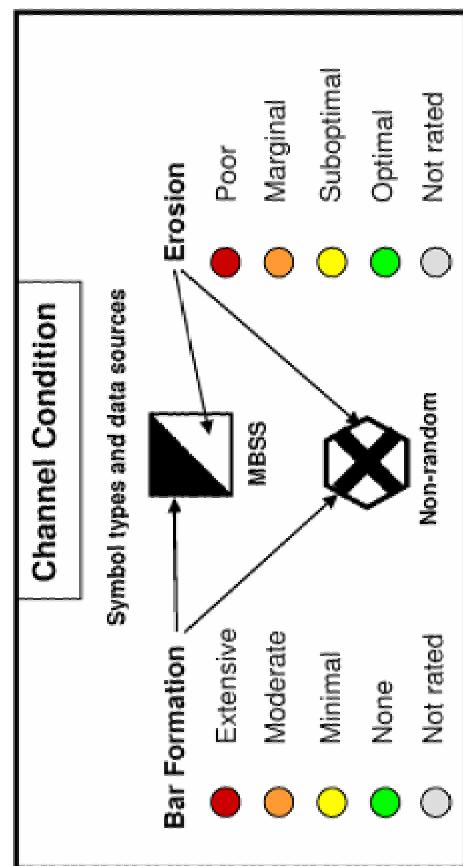




Figure 8-150. Benthic Index of Biotic Integrity (BIBI) and Fish Index of Biotic Integrity (FIBI) pie charts and map of stream health for Prince George's County streams sampled by the MBS S during 1995-97 and 2000-2004 (pie charts represent 2000-2004 data only, Combined Biotic Index pie chart represents mean of FIBI and BIBI)

Table 8-37. MBSS sites sampled in Prince George's County during 1994- 2004, ranked by Combined Biotic Index Score (CBI)

Prince George's County - MBSS Sites					
SITE NUMBER	STREAM NAME	WATERSHED	CBI	SITE NUMBER	STREAM NAME
<i>Best (in order of CBI score)</i>					
CH-S-231-209-97	Swanson Creek	Patuxent River Lower	4.83	ANAC-122-R-2004	Indian Creek UT UT2
PG-S-047-211-97	Rock Branch to Spice Creek	Patuxent River Lower	4.69	OXON-205-R-2001	Oxon Run UT1
PG-N-155-201-97	Piscataway Creek	Piscataway Creek	4.55	OXON-101-R-2001	Oxon Run
PG-N-098-320-97	Beaverdam Creek	Anacostia River	4.52	PAXU-113-R-2004	Patuxent River UT10
PG-N-028-301-97	Beaverdam Creek	Anacostia River	4.38	PAXU-105-R-2004	Walter Branch
WEBR-201-R-2001	Lotsford Branch	Western Branch	4.29	PAXU-103-R-2004	Patuxent River UT9
PG-N-130-327-97	Piscataway Creek	Piscataway Creek	4.24	PAXU-117-R-2004	Horsepen Branch UT
PAXM-106-R-2001	Mataponi Creek UT1	Patuxent River Middle	4.21	PAXM-112-R-2001	Swan Point Creek
WEBR-104-R-2001	Folly Branch	Western Branch	4.14	PG-S-007-108-97	Summerville Creek UT
PG-N-219-324-97	Western Branch	Western Branch	4.14	PAXM-107-R-2001	Patuxent River UT7
WEBR-110-R-2001	Black Branch	Western Branch	4.12	PAXU-114-R-2004	Crow Branch UT
PG-N-219-306-97	Western Branch	Western Branch	4.10	PRUT-107-R-2001	Henson Creek UT2
PG-N-027-213-97	Bald Hill Branch	Western Branch	4.07	PG-N-087-115-97	Collington Branch UT
PAXM-211-R-2001	Mataponi Creek	Patuxent River Middle	4.05	CH-S-139-118-95	Zekiah Swamp Run
PAXM-109-R-2001	District Branch	Patuxent River Middle	3.98	PG-N-065-103-97	Cattail Branch
WEBR-105-R-2001	Back Branch	Western Branch	3.98	PG-N-125-228-97	Beaverdam Creek
PG-N-135-231-97	Charles Branch	Patuxent River Middle	3.95	ANAC-114-R-2004	Indian Creek UT2
MATT-320-R-2000	Mattawoman Creek	Mattawoman Creek	3.90	PG-N-171-309-97	Northwest Branch
PG-S-052-109-95	Wolf Den Branch	Zekiah Swamp	3.90	PG-N-007-127-97	Patuxent River UT
PAXL-205-R-2004	Tom Walls Branch	Patuxent River Lower	3.88	PAXL-108-R-2004	Stanley Run UT
PG-S-045-317-97	Swanson Creek	Patuxent River Lower	3.86	WEBR-106-R-2001	Folley Branch UT1
NCRW-214-N-2004	Accokeek Creek	Potomac River Upper (Tidal)	3.81	PG-S-005-220-95	Mattawoman Creek
PG-N-141-223-97	Northeast Branch Western Branch	Western Branch	3.71	PISC-115-R-2001	Piscataway Creek UT1
PG-N-141-215-97	Northeast Branch Western Branch	Western Branch	3.69	PISC-105-R-2001	Tinkers Creek UT1
WEBR-111-R-2001	Back Branch	Western Branch	3.67	PISC-104-R-2001	Tinkers Creek UT2
<i>Worst (most degraded sites first)</i>					
ANAC-122-R-2004	Indian Creek UT UT2	Anacostia River	1.00		
OXON-205-R-2001	Oxon Run UT1	Oxon Creek	1.00		
OXON-101-R-2001	Oxon Run	Oxon Creek	1.29		
PAXU-113-R-2004	Patuxent River UT10	Patuxent River Upper	1.29		
PAXU-105-R-2004	Walter Branch	Patuxent River Upper	1.33		
PAXU-103-R-2004	Patuxent River UT9	Patuxent River Upper	1.43		
PAXU-117-R-2004	Horsepen Branch UT	Patuxent River Upper	1.45		
PAXM-112-R-2001	Swan Point Creek	Patuxent River Middle	1.48		
PG-S-007-108-97	Summerville Creek UT	Patuxent River Lower	1.57		
PAXM-107-R-2001	Patuxent River UT7	Patuxent River Middle	1.57		
PAXU-114-R-2004	Crow Branch UT	Patuxent River Upper	1.57		
PRUT-107-R-2001	Henson Creek UT2	Potomac River Upper (Tidal)	1.57		
PG-N-087-115-97	Collington Branch UT	Western Branch	1.57		
CH-S-139-118-95	Zekiah Swamp Run	Zekiah Swamp	1.57		
PG-N-065-103-97	Cattail Branch	Anacostia River	1.76		
PG-N-125-228-97	Beaverdam Creek	Anacostia River	1.79		
ANAC-114-R-2004	Indian Creek UT2	Anacostia River	1.86		
PG-N-171-309-97	Northwest Branch	Anacostia River	2.00		
PG-N-007-127-97	Patuxent River UT	Patuxent River Upper	2.00		
PAXL-108-R-2004	Stanley Run UT	Patuxent River Lower	2.07		
WEBR-106-R-2001	Folley Branch UT1	Western Branch	2.07		
PG-S-005-220-95	Mattawoman Creek	Mattawoman Creek	2.14		
PISC-115-R-2001	Piscataway Creek UT1	Piscataway Creek	2.14		
PISC-105-R-2001	Tinkers Creek UT1	Piscataway Creek	2.14		
PISC-104-R-2001	Tinkers Creek UT2	Piscataway Creek	2.19		

Table 8-38.

Stream Waders sites sampled in Prince George's County during 2000-2004, ranked by Family-level Benthic Index of Biotic Integrity

Prince George's County - Stream Wader Sites				
WATERSHED	# GOOD	# FAIR	# POOR	# VERY POOR
Anacostia River	0	0	6	33
Mattawoman Creek	0	5	1	4
Patuxent River Lower	0	1	0	4
Patuxent River Middle	0	1	0	3
Patuxent River Upper	0	1	3	25
Piscataway Creek	6	2	4	5
Western Branch	1	1	5	52
Zekiah Swamp	0	0	3	0

The Prince George's County Department of Environmental Resources, began a five-year, rotating basin sampling across the county in 1999. The primary goals of the Prince George's County biomonitoring program are to assess the ecological status of County streams and watersheds and to establish a baseline for comparing future assessments. Results are also related to programmatic activities, such as BMP siting, installation, and evaluation; stormwater discharge permits; contributing to restoration initiatives; and guidelines for Low Impact Development (Stribling et al. 1999).

The County's overall sampling design was developed based on EPA's Rapid Bioassessment Protocol (Barbour et al. 1999) and modified to be directly comparable to the MBSS and to allow for the sharing of data among agencies. Specifically, the program samples approximately 50 sites in six to ten watersheds per year. A total of 207 sites in 23 watersheds were sampled during a span of four years. Final selection and placement of sampling segments was random and stratified by watershed and stream order (Leppo et al. 2004).

Spring sampling includes benthic macroinvertebrate, and physical habitat assessments, and summer sampling including fish, and water chemistry is performed in accordance with the Prince George's Biological Monitoring Assessment Program Plan (PG DER 2000). Field chemistry sampling, modified Wolman pebble counts, and channel cross-sections are also conducted. Laboratory processing of benthic macroinvertebrates is consistent with MBSS methods outlined in Boward and Friedman (2000). MBSS IBIs (Southland et al. 2005) were calculated for each site.

In order to better estimate stream condition in the County, MBSS data were integrated with Prince George's County data to arrive at a combined estimate of stream condition using the benthic macroinvertebrate IBI. The scores from approximately 325 benthic macroinvertebrate sampled County sites and 140 fish sampled County sites were combined with scores from 64 random MBSS sites. Results are shown in the following table. Note that while the overall score changes little, the standard error decreases drastically when the data from the programs are combined; thus increasing the precision of the estimate. This increased precision allows for a more accurate assessment of overall stream health in Prince George's County. In the future, the MBSS and the County will continue to coordinate sampling in ways that balance monitoring effort and desired precision of stream condition estimates.

Sampling Program	Mean Benthic IBI	Standard Error	Condition Class
MBSS Alone	2.66	0.10	Poor
Prince George's County Alone	2.93	0.05	Poor
Combined	2.88	0.002	Poor

Sampling Program	Mean Fish IBI	Standard Error	Condition Class
MBSS Alone	2.91	0.16	Poor
Prince George's County Alone	3.42	0.10	Fair
Combined	3.28	0.007	Fair

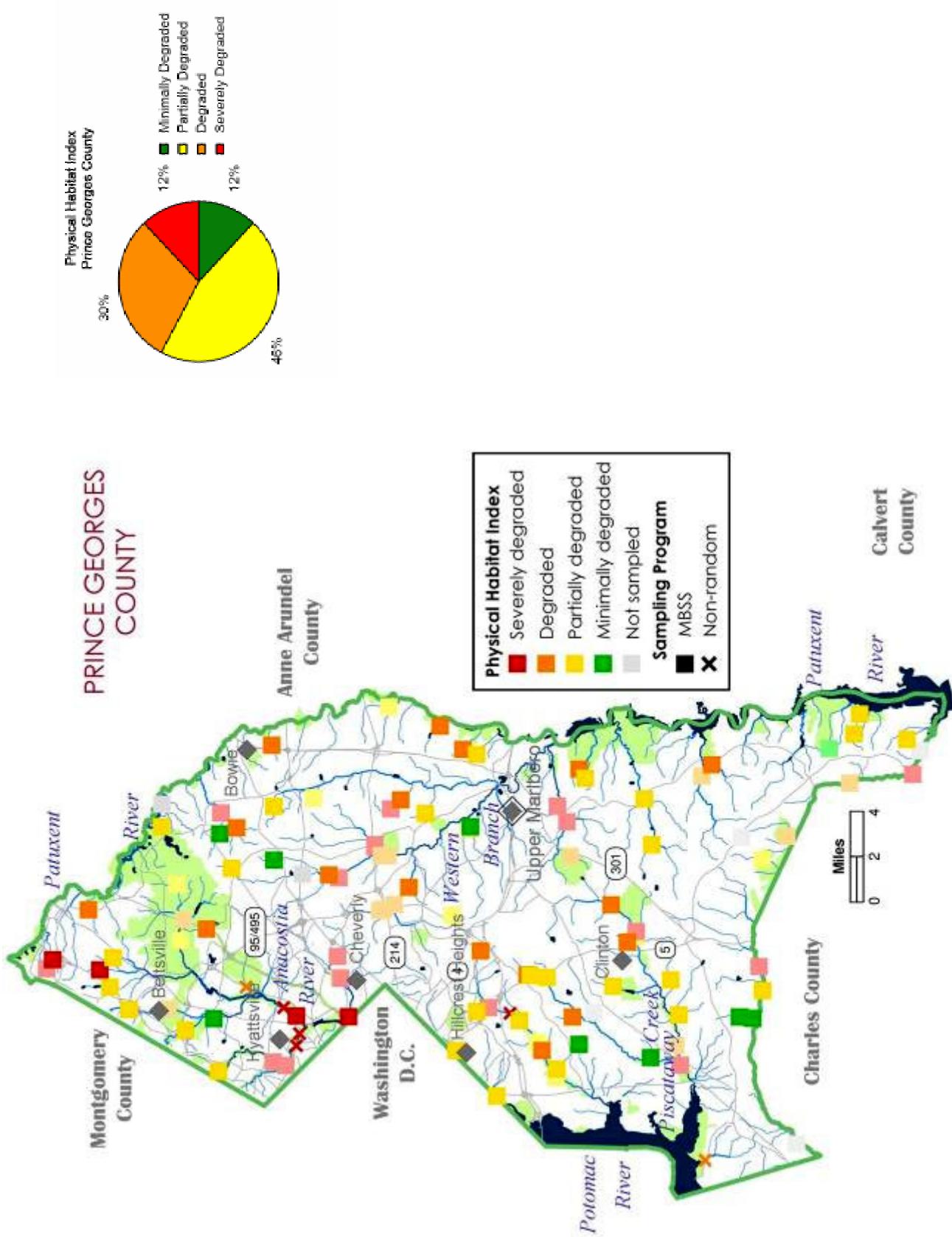


Figure 8-151. Physical Habitat Index (PHI) pie chart and map of stream habitat quality for Prince George's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

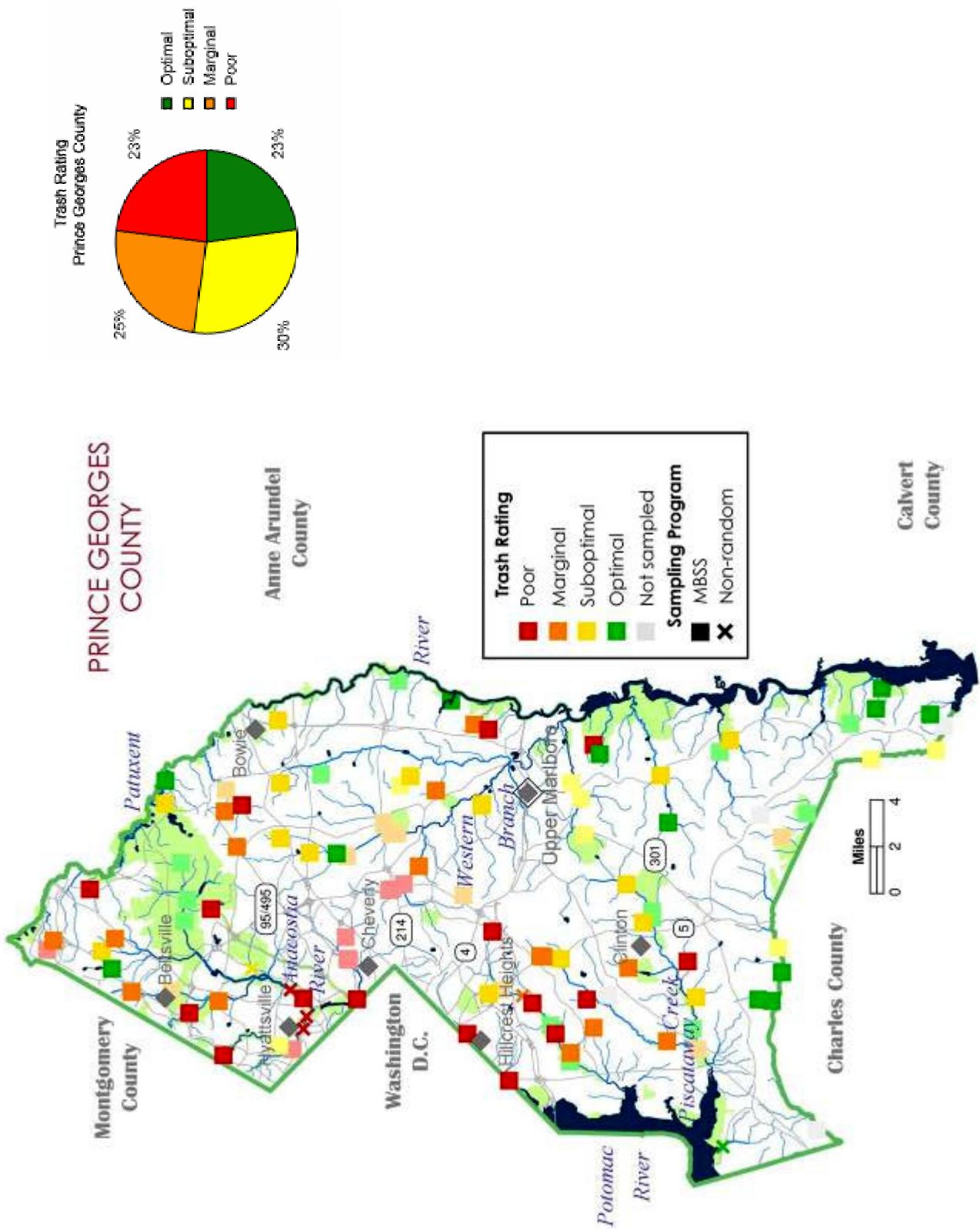


Figure 8-152. Pie chart and map of trash rating (0-20 scale) for Prince George's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only)

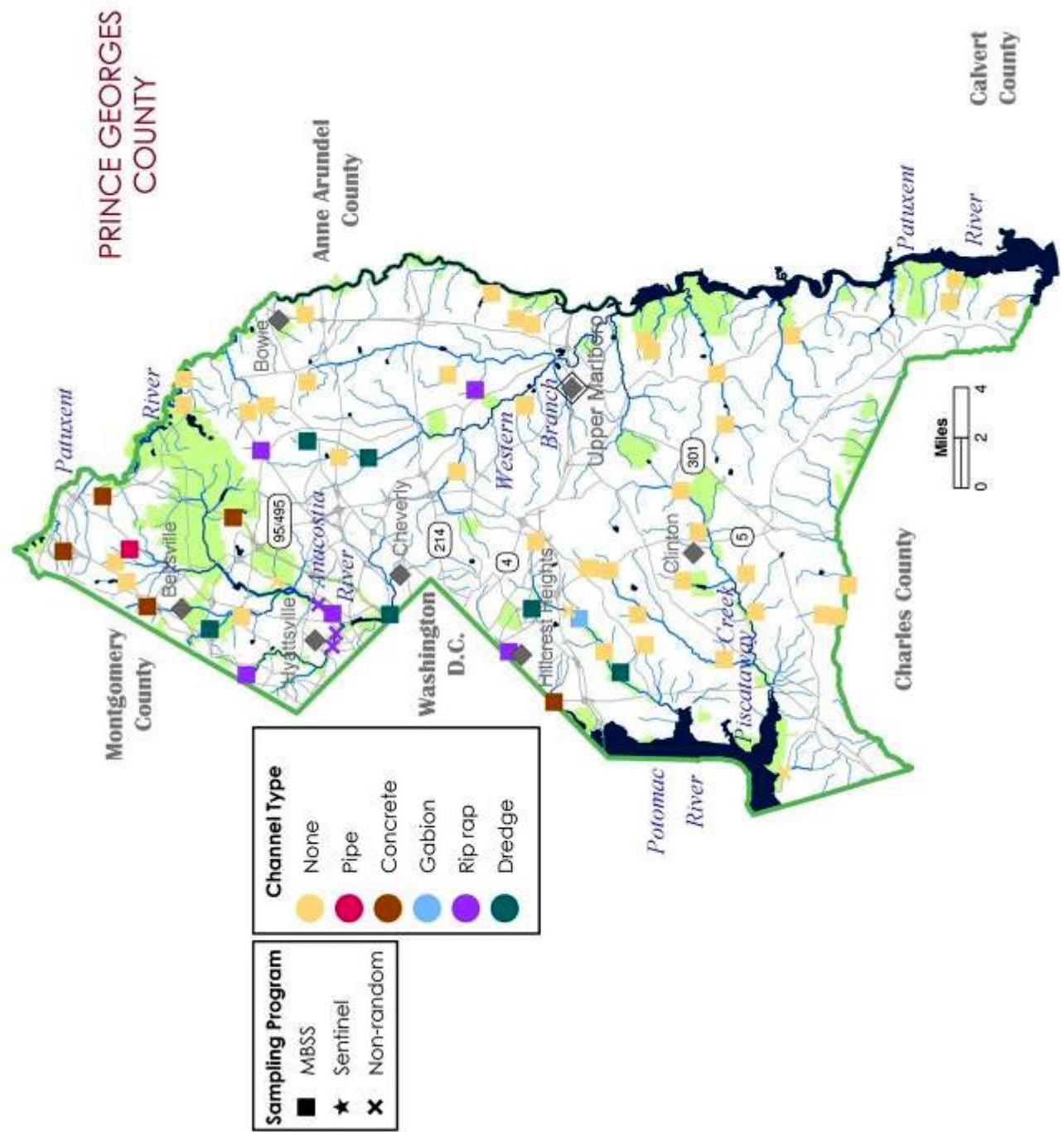


Figure 8-153. Map of channelized sites, by type, for Prince George's County streams sampled by the MBSS during 2000-2004. NOTE: When channelization is indicated, it does not necessarily mean that the entire 75m segment was affected.

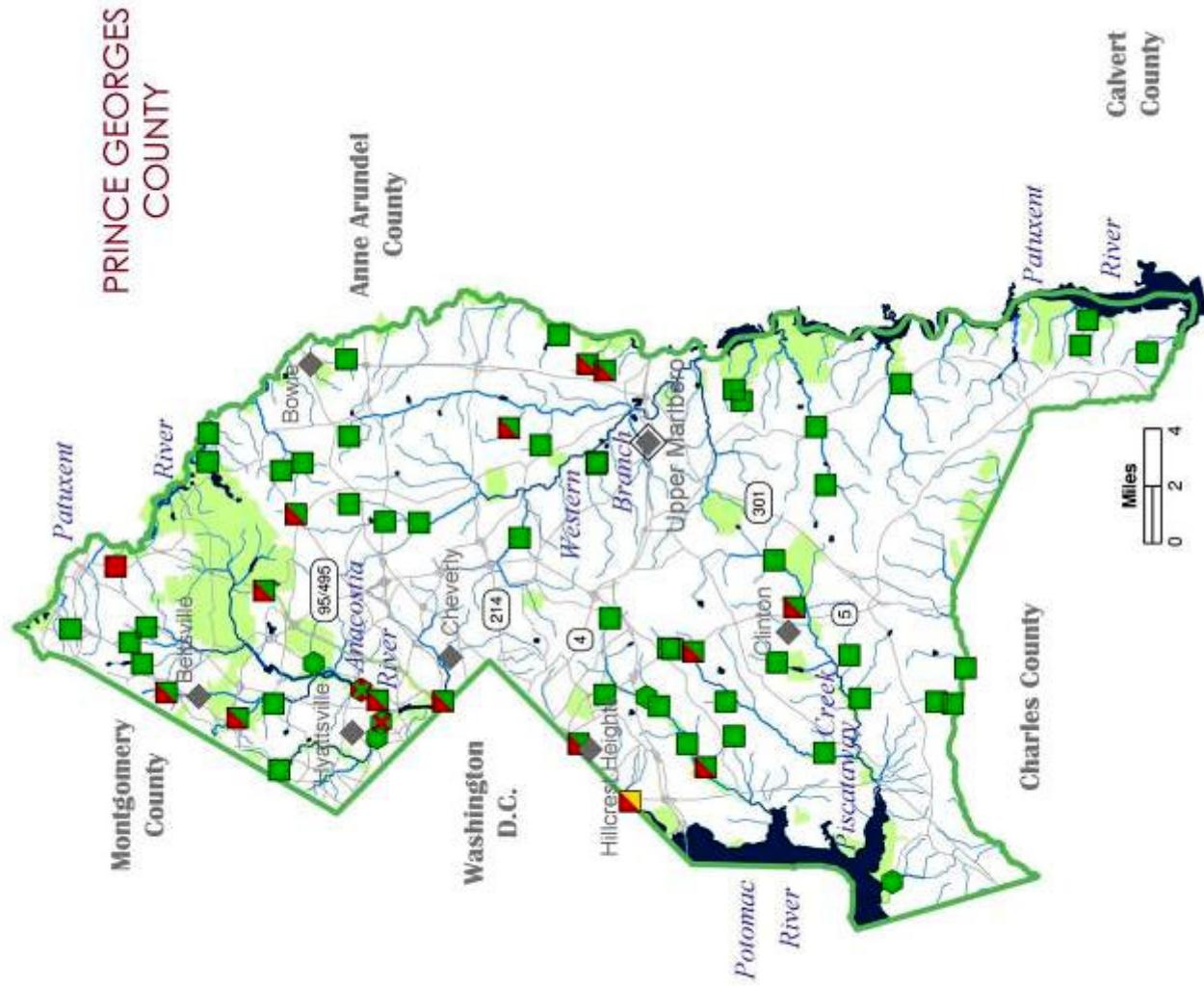


Figure 8-154. Map of sites with inadequate riparian buffers and buffer breaks for Prince George's County streams sampled by the MBSS during 2000-2004. NOTE: Multiple riparian buffer breaks sometimes occurred at a site; only the most severe was depicted.

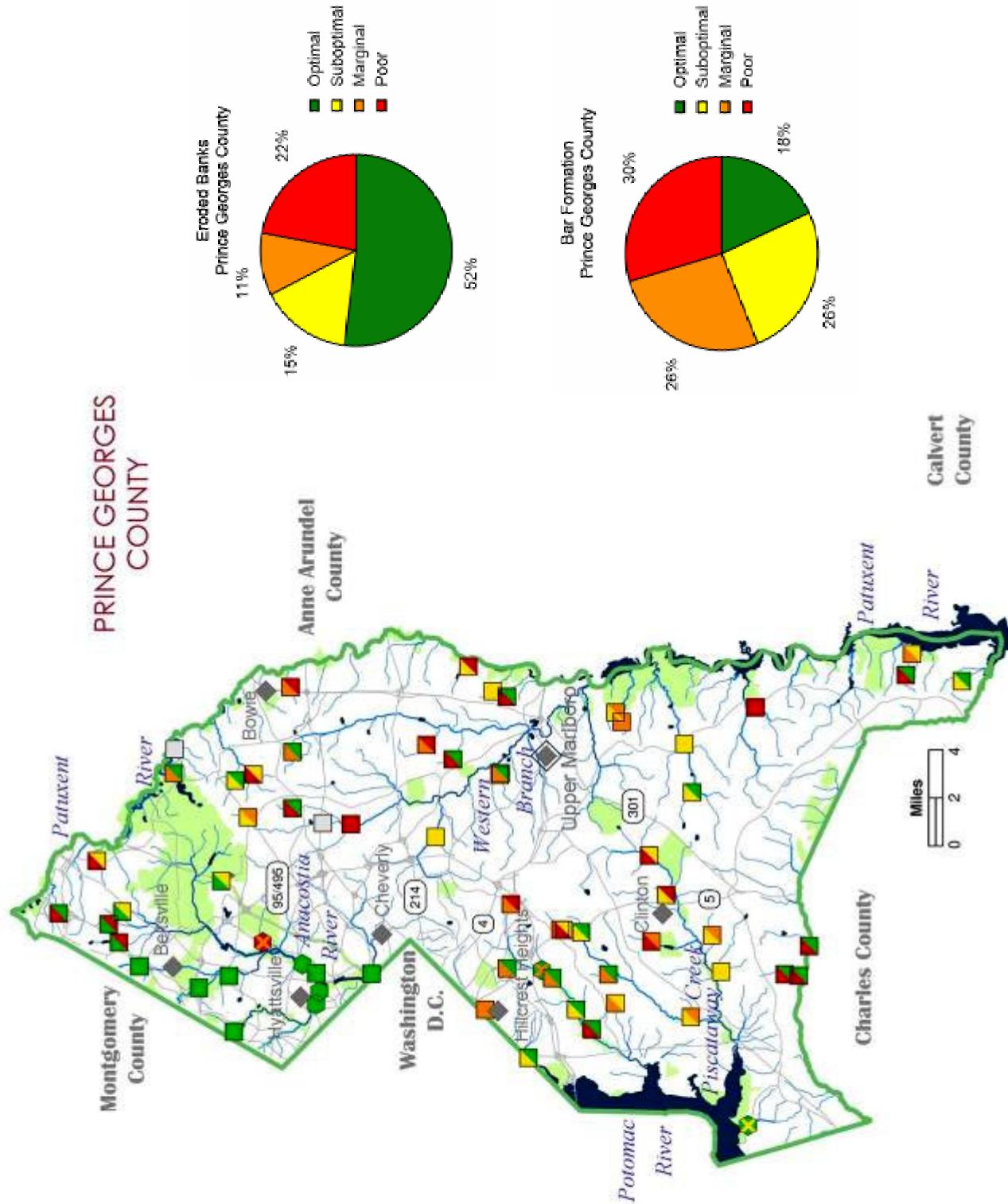


Figure 8-155. Pie charts and map of sites with eroded banks and instream bar formation for Prince George's County streams sampled by the MBSS during 2000-2004

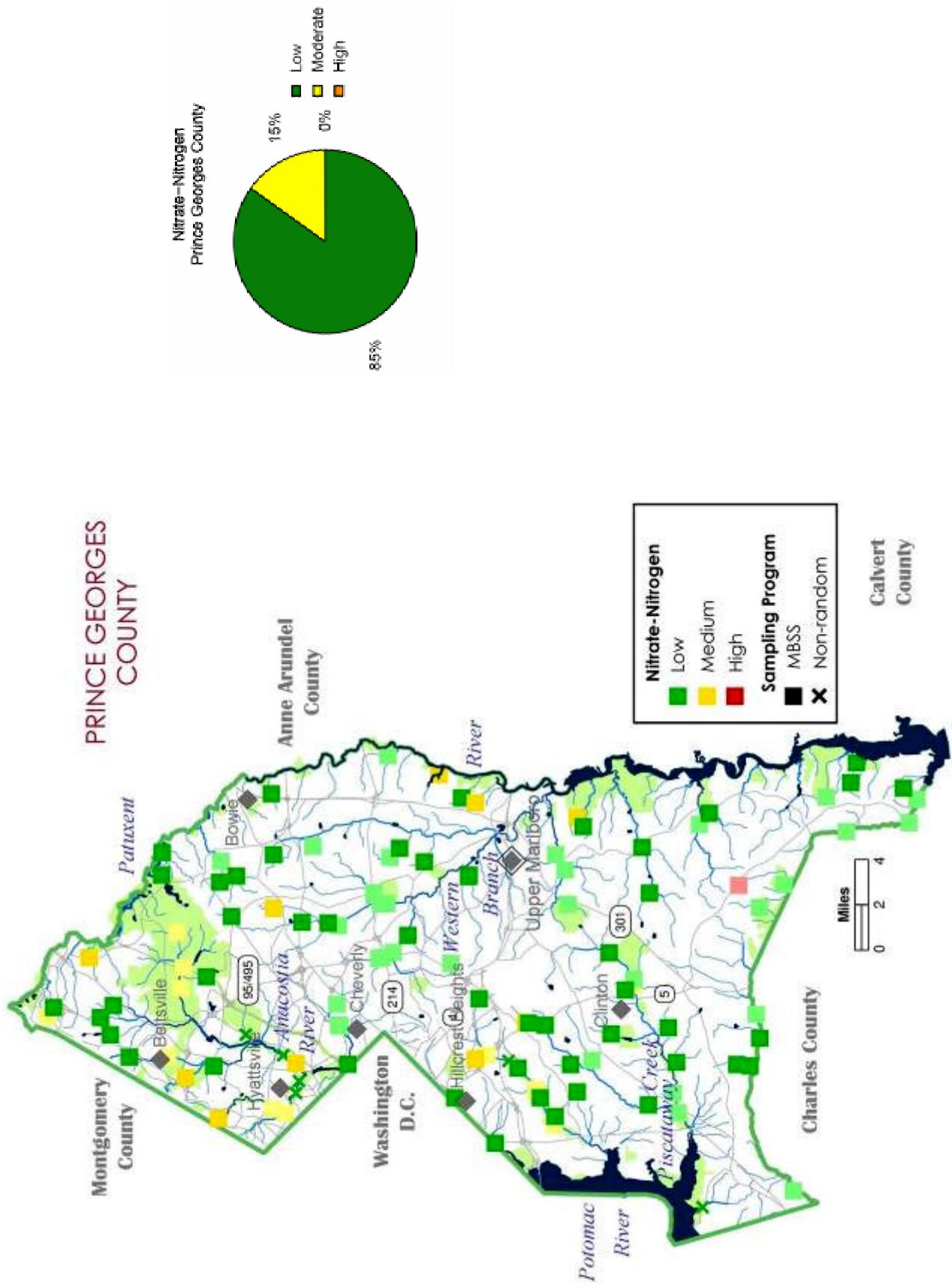


Figure 8-156. Pie chart and map of nitrate-nitrogen values (mg/l) for Prince George's County streams sampled by the MBSS during 1995-97 and 2000-2004 (pie chart represents 2000-2004 data only) (Low = 1.0, Medium = 1.0 – 5.0, High = > 5.0)

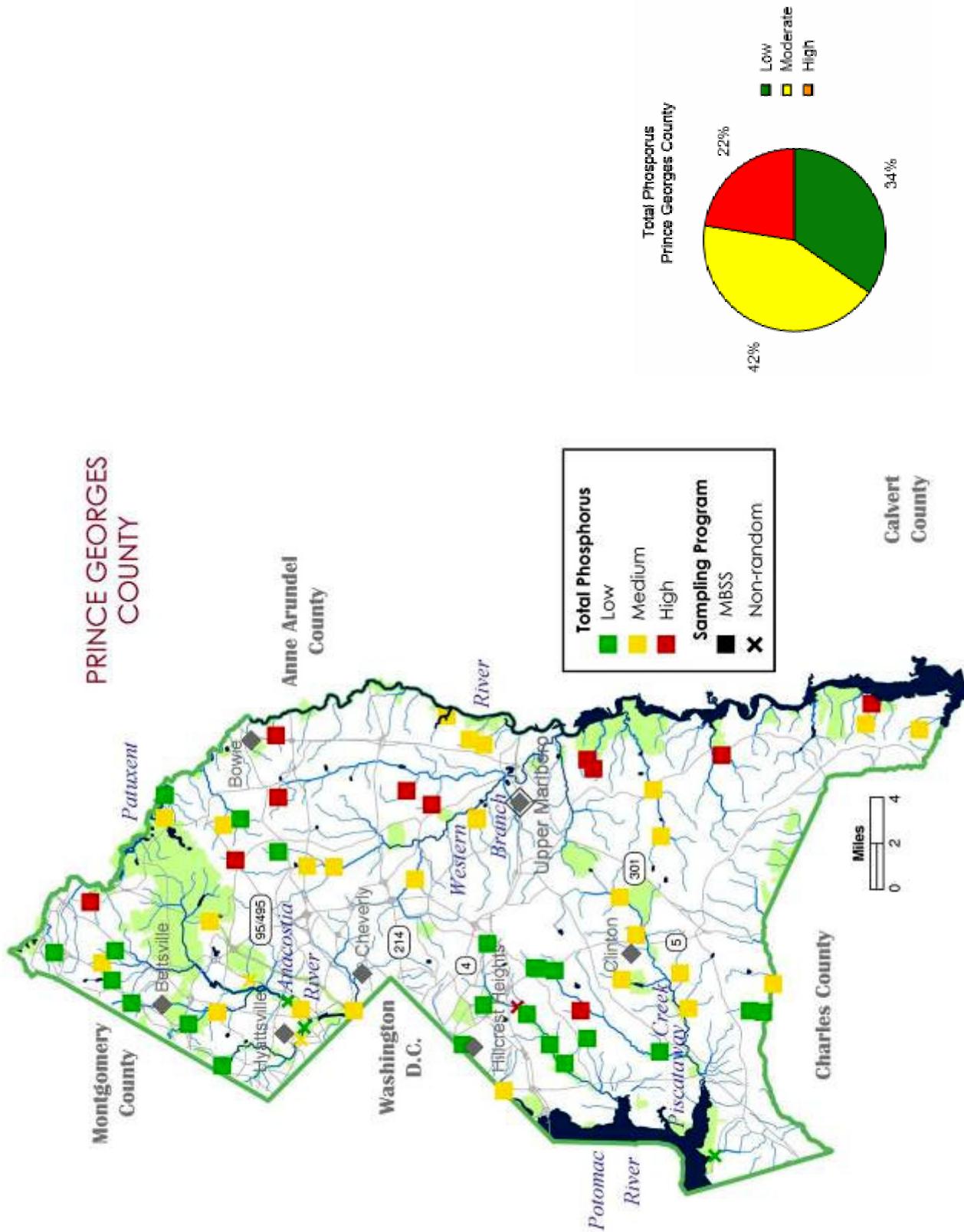


Figure 8-157. Pie chart and map of total phosphorus values (mg/l) for Prince George's County streams sampled by the MBSS during 2000-2004 (Low = < 0.025 , Medium = $0.025 - 0.07$, High = > 0.07)

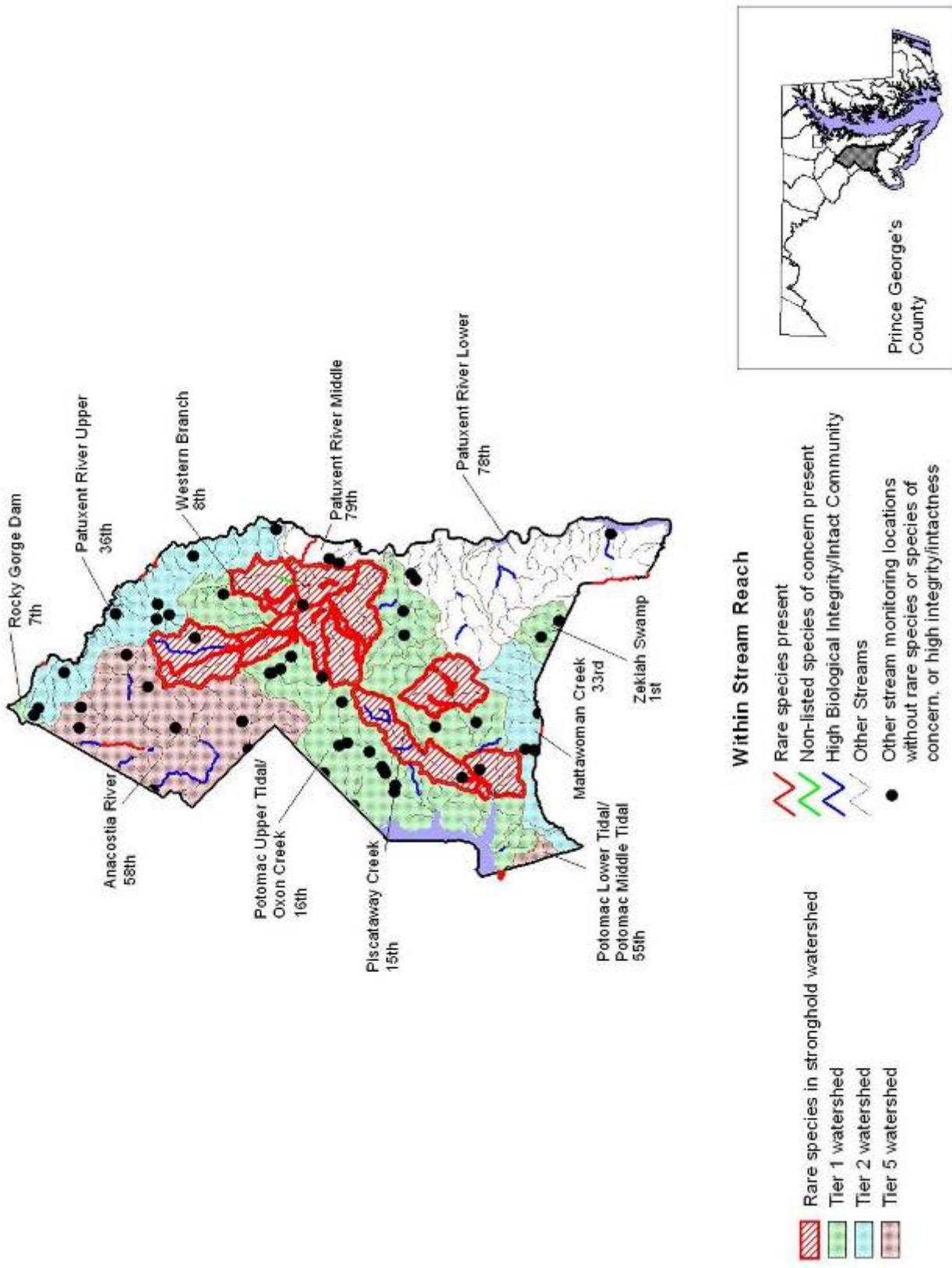


Figure 8-158. Aquatic Heritage Biodiversity Ranking map for Prince George's County, by watershed. Data from MBSS 1994-2004, MBSS qualitative data, Raesly, unpub. data, Harris 1975, Thompson 1984, and DNR Natural Heritage Program database.